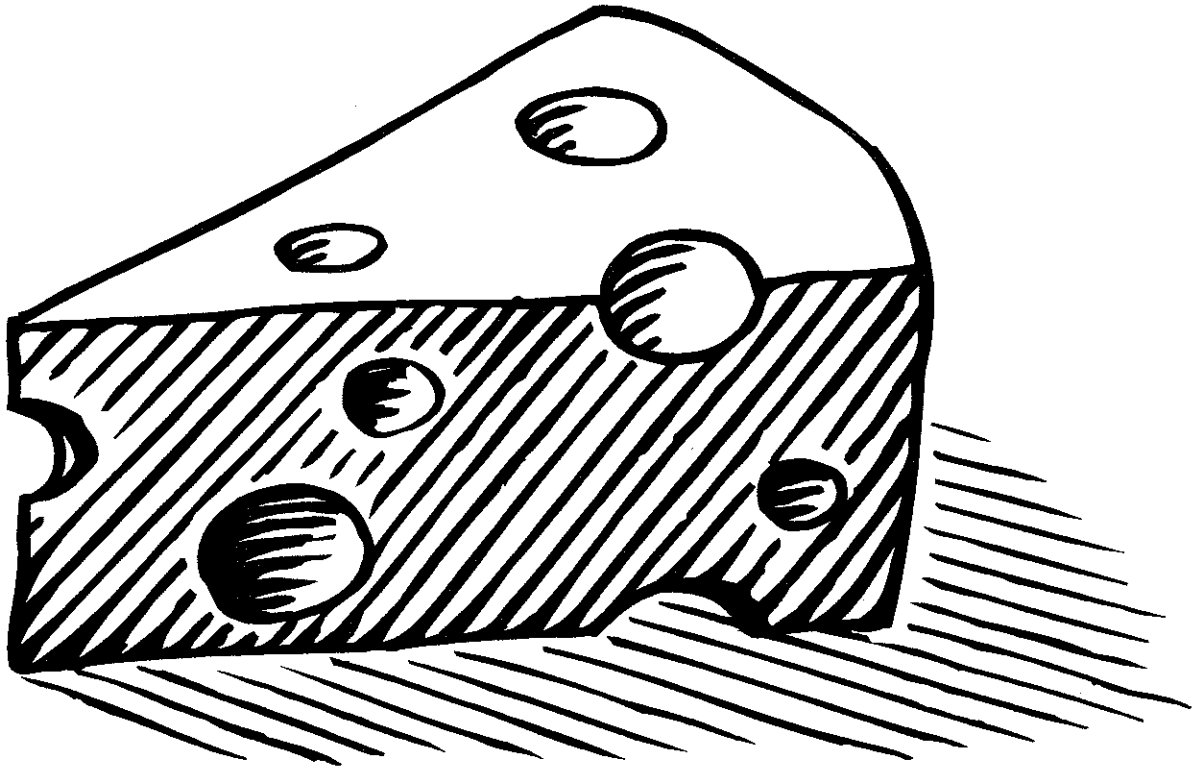
Idaho is in the top 5 largest manufacturers of natural **cheese** and American style **cheese** in the U.S. making more than 700 million total pounds per year.

All **cheese** is made from milk, but different aging processes are used to produce the many varieties of **cheeses** available. Milk is turned into **cheese** by curdling the milk, stirring and heating the curd, draining off the whey (watery part of milk), collecting and pressing the curd, and in some cases, ripening. Bacteria acidifies the milk and plays a role in defining the texture and flavor of most **cheeses**. Some **cheeses** actually feature mold on the rind or throughout to flavor the **cheese.** It takes 10 pounds of milk to make 1 pound of **cheese!**

There are more than 400 types of **cheeses** produced all over the world. **Cheese** is a nutrient dense food and provides the body with essential nutrients like calcium, phosphorus, Vitamin D and protein.

IDAHO PREFERRED

Cheese is a great addition to any meal. Shred it over eggs at breakfast, grab a string **cheese** for a quick healthy snack, add it to your favorite sandwich at lunch or melt it over vegetables at dinner.



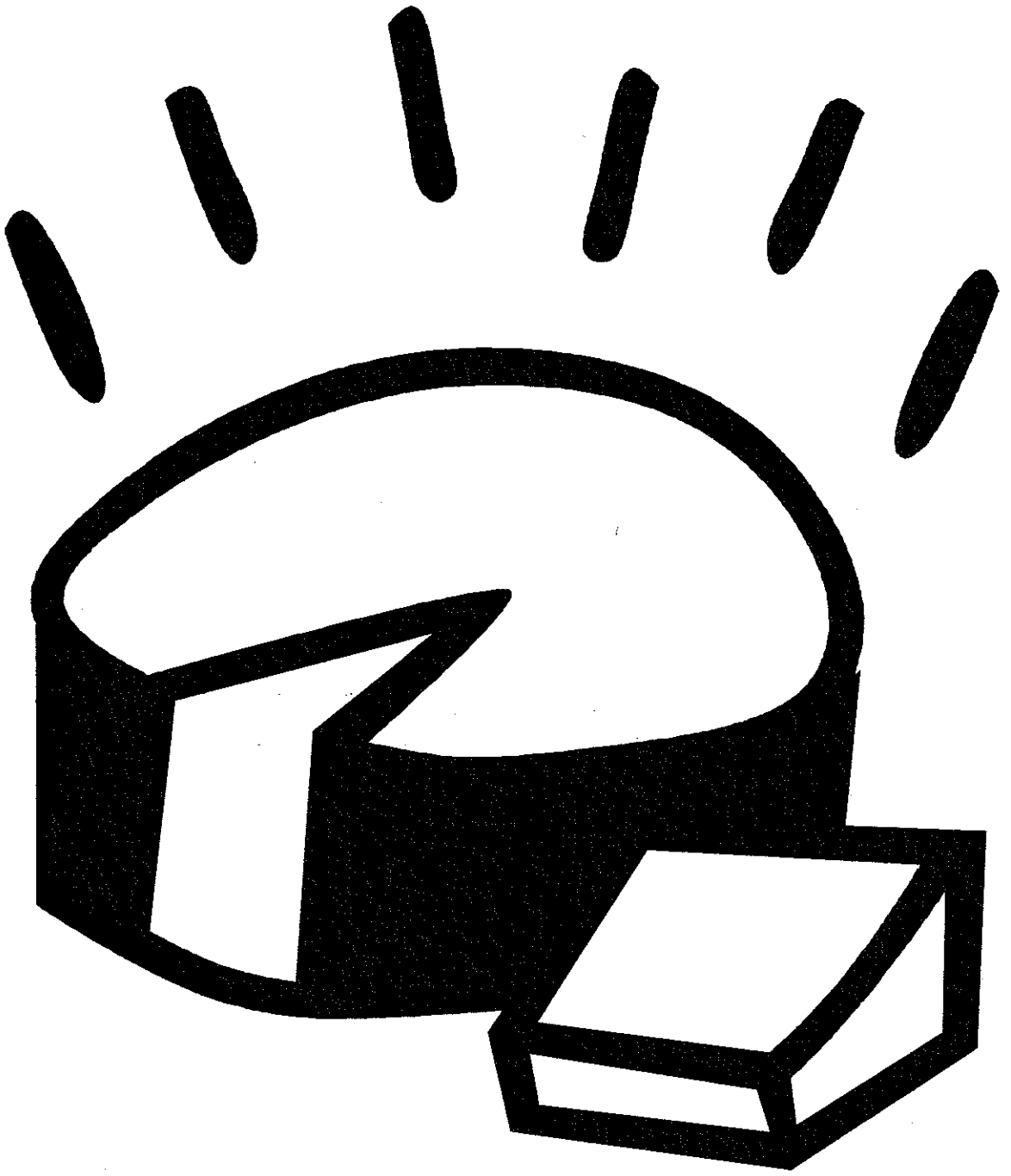
Can you name four types of cheese?

1.

2.

3.

4.



Cheese!

GETTING TO KNOW FRACTIONS AND EQUIVALENT FRACTIONS – GRADES 3-5

OVERVIEW:
Fractions are used to represent the parts of a whole. The denominator represents the whole, and the numerator represents the parts. Fractions can be modeled by dividing a unit into equal parts. Equivalent fractions are fractions that name the same number. In this lesson, students will be introduced to the concept of fractions and equivalent fractions by using pizzas as manipulative tools to model the part-to-whole relationship.

OBJECTIVES:
Students will be able to:

1. Recognize and explain the part to whole relationship of a fraction.
2. Using the pizzas, model a given numerical fraction.
3. Using the pizzas, model the same fraction in more than one way.

MATERIALS:
Paper model of a pizza, ingredients for 6 cheese pizzas, notebooks and pencils.

RELATED LITERATURE:
Piece=Part=Portion: Fractions=Decimals=Percents – Scott Gifford, Tricycle Press (2003)
Fraction Fun – David Adler, Holiday House (1997)
The Hershey's Milk Chocolate Bar Fraction Book – Jerry Pallotta, Cartwheel Books (1999)

PROCEDURES:

- Show students paper "model" of a pizza. Give model to one student and then ask the class if anyone would like to have a piece. Discuss ways that several class members could share the pizza by cutting the model.
- Explain how we can use fractions to represent parts of a whole. The denominator represents the whole number of slices and the numerator would represent individual slices. Explain that equivalent fractions are fractions that name the same number.
- Divide class into 6 small groups. Explain that we will be using real pizzas to help us learn about fractions and equivalent fractions.
- At this point, the students can prepare the pizzas or the previously prepared pizzas can be brought out. (All surfaces and hands should be washed prior to the next steps.)
- Assign fractions and give a whole pizza to each group. Groups should then cut their pizza to represent their fraction. The following fractions should be used: halves, fourths, eighths, thirds, sixths and ninths. Assist students with cutting as needed.
- Have students record, numerically and pictorially in a notebook, the different fractions that they are able to create with their pizza.
- Team up the following groups: (halves, fourths, eighths) and (thirds, sixths, ninths). Ask groups to model various equivalent fractions using their pizzas. Again, record results in notebooks.
- Enjoy eating the pizza.

PRODUCTS USED:
Sorrento® Shredded Mozzarella
Prior to the lesson the students can make the pizzas. Classroom "cooking" has

many teachable moments and is well worth the extra effort. However, if this is not feasible, the teacher can prepare the pizzas on his/her own.

ASSESSMENT:

Have students do the following activity sheet. This document is in Adobe Acrobat .PDF format. You will need the Adobe Acrobat Reader application to open, view and print these documents. If you do not have the Adobe Acrobat Reader application, you can **download it** free of charge from the Adobe Web site.

Name _____

Draw a model to represent the fraction:

1. $\frac{3}{4}$

2. $\frac{2}{3}$

3. $\frac{1}{6}$

4. $\frac{2}{5}$

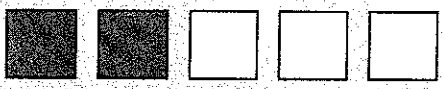
5. $\frac{5}{8}$

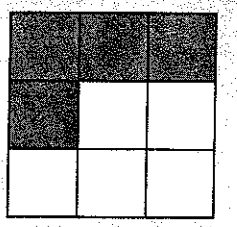
6. $\frac{6}{10}$

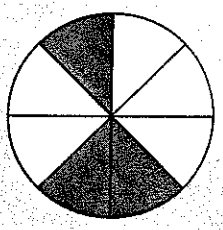
7. $\frac{1}{5}$

8. $\frac{3}{3}$

Write a fraction for the part that is shaded:

1.  = _____

2.  = _____

3.  = _____

CHARTING MOLD GROWTH ON CHEESE – GRADES 3-6

OVERVIEW:
Microscopic organisms such as molds grow and reproduce all around us. In this activity, students will see that these organisms are all around us, that they can be affected by different environmental factors and that their population growth can be observed and charted based on available food supply.

BACKGROUND INFORMATION:
Mold, which is produced by several types of fungi, is able to "travel" as airborne spores. These spores can germinate on contact with the moist surface of nonliving organic matter. It is able to spread rapidly and as its food supply runs out, mold begins to die off. Dampness, warmth and the absence of light will yield optimum results for growing molds. Molds need to be handled carefully, as mold spores may cause allergic reactions.

OBJECTIVES:
Students will be able to:

1. Identify sources of microorganisms, such as air, water, hard surfaces.
2. Show mold growth on an available food source.
3. Chart mold growth and decline over time as the food source runs out.
4. Identify environmental factors (variables) that contribute to and inhibit mold growth (heat, cold, light, dark, storage in clean vs. dirty container, etc.).

MATERIALS:
Sorrento® Mozzarella Cheese, plastic baggies – twist-tie or zip, tape, mold growth record sheet, paper, hand lenses, shade box (can be made using black construction paper or use a regular box), access to refrigerator.

PROCEDURES:

- To prepare the sample, have the students cut cheese into square or rectangular shape. Place cheese on a piece of paper and trace cheese shape onto paper. Cut out cheese shape and retrace onto mold growth record sheet. (By tracing onto paper first, the record sheet will not become soiled.)
- Place cheese sample into plastic baggie, close tightly. The students should label their sample, using a piece of tape.
- On mold growth record sheet, record where sample is being stored – refrigerator, under shade box, sunny window, etc. (variable being tested).
- Observe daily and color in mold growth on record sheet. Use a different color for each day of observation.
- Observe with hand lens. As food source (cheese) runs out, mold will begin to die off itself. Record whether the number of squares colored in on record sheet increases, decreases or stays the same, record any observations of the mold, such as color, or pattern.
- Compare class results. Hypothesize which factor or factors caused mold growth to occur faster than others did. Which factor or factors causes the most mold growth? On the last day of the project, the students should record their conclusions as to what affected their sample.
- Discuss which samples had the fastest/slowest mold growth. Was there more than one type of mold growing on the samples? How could the mold growth have been prevented?

FOLLOW THAT CHEESE — GRADES 4-6

OVERVIEW:
In this lesson, students will first brainstorm a list of different types of cheeses. They will select a cheese and be required to find its country or state of origin. Students will then research that particular country or state. They will be asked to prepare a written report and then give an oral presentation using the information they have collected. Following the presentations, the class will have a cheese-tasting celebration as a culminating activity.

OBJECTIVES:
Students will be able to:

1. Research and gather information using different sources.
2. Use information to write a report on their country or state.
3. Give oral presentations to their classmates.

MATERIALS:
Paper, rubrics, pencils, various cheeses.

RELATED LITERATURE:
Cheese (From The Farm To You) – Carol Jones, Chelsea House Publishing (2002)

PROCEDURES:

- Discuss how many foods we eat every day, such as cheese, have their origins in different places.
- Have students brainstorm a list of different types of cheese.
- Assign each student a type of cheese from the list.
- Tell the students they will be researching, preparing and presenting a brief research report on the country/state of origin of their assigned cheese.
- Create a framework with the class for the report. Discuss what information should be included in the report. For example: Name of country, location, climate, language, bordering countries, currency, form of government, population, exports etc.
- Discuss possible sources of information, both electronic and non-electronic.
- Discuss what sources will be required and how to cite sources properly.
- Explain how the report and presentation will be assessed. If a rubric is to be used, give students the rubric prior to report and presentation due date, so students are aware of expectations and requirements. (Excellent ready-made rubrics are available at **www.teach-nology.com**)
- Tell students there will be a cheese-tasting celebration on the day of the oral presentations. The teacher will supply various cheeses, however students are welcome to prepare any cheesy treats that would correspond well with their report.

PRODUCTS USED:
Sorrento® Stringsters® String Cheese, Sticksters® Cheese Sticks, Provolone, Ricotta, Parmesan, Romano, and Asiago.
These are some possible choices of cheeses to be used at the Cheese-Tasting Celebration.

ASSESSMENT:

MEASURING LENGTH WITH STRING CHEESE — GRADES 1-2

OVERVIEW:
Length can be measured using many forms, from metric units to standard units. Students can learn how to measure length by using various tools such as a ruler, yardstick, meter stick or tape measure. They can also measure length using nonstandard measurement. Nonstandard measurement can use any available "tool" as a measurement device. Non-standard measurement can be used when people need to measure something and they do not have a traditional measuring tool in their possession. In this lesson, children will learn how to measure using a nonstandard measurement tool, one in which many of them are quite familiar with – string cheese!

OBJECTIVES:
Students will be able to:

1. Estimate and measure the length of various classroom objects.
2. Explain what a nonstandard measurement tool is, when they might need to use one, and why they are useful.

MATERIALS:
Sorrento® Stringsters String Cheese (one for each student), pencil, measurement recording sheet, various classroom items that are listed on record sheet.

RELATED LITERATURE:
Measuring Penny – Loreen Leedy, Henry Holt & Co., 1998
The Fattest, Tallest, Biggest Snowman Ever – Betting Ling & Marilyn Burns, Scholastic, 1996
Twelve Snails to One Lizard – Susan Hightower & Matt Novak, Simon & Schuster, 1997
Super Sand Castle Saturday – Stuart J. Murphy & Enid Blyton, Harper Collins, 1999

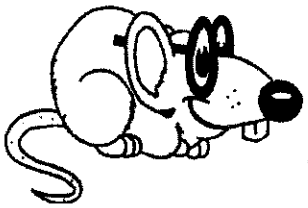
PROCEDURES:

- Ask children how we can measure the length of something. Ask them what we could use if we didn't have a ruler or "traditional" measuring tool.
- Read any of the stories listed in the related literature section to the children. Discuss how the character(s) in the story measured various objects.
- Explain how we can use nonstandard tools to measure length.
- Introduce our nonstandard measurement tool – string cheese.
- Explain to children that when we are done with our measuring they can eat their measurement tool!
- Decide whether or not to include the packaging as a part of the tool, or to just measure according to the length of the cheese only. (Regardless of decision, keep string cheese in packaging until all measurement is completed and the lesson is over.)
- Pass out measurement recording sheet, and go over items listed on sheet. Explain that they are to add two items of their choice to be measured.
- Review the items listed on the record sheet, as well as rules for estimation.
- Model estimating and measuring one of the items on the record sheet.
- Have students begin to estimate and record measurements on their

sheet.
- Circulate around the room to check for understanding.
- Eat string cheese when done with measuring.

ASSESSMENT:

On record sheet, have children record answers to the following questions:
- What is a nonstandard measurement tool?
- List four examples of items that can be used as nonstandard measurement tools.
- Why would you use a nonstandard tool to measure something?



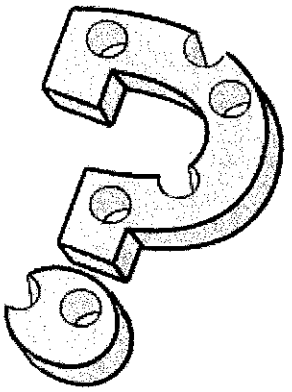
My name is.....

Use a pencil to help Monty mouse
follow the line to the cheese

Cheese Questions

Try finding the answers to our cheesy questions

1. What is cheese made from?
2. What is the mineral in cheese that makes your bones and teeth strong?
3. What does Vitamin A do?
4. How much cheese can you make with 10 gallons of milk?
5. How many different cheeses are made in the U.S.?
6. From where does Cheddar get its name?



From Farm to Fridge

From the farm to your table, the biggest challenge is to maintain dairy products at a constant temperature every step of the way in order to ensure the highest quality products. And, did you know that Canadian dairy products are made with our very own milk, produced according to the highest standards?

At the Farm

At the farm, producers make sure their cows are in good health. Whenever a cow becomes sick, it is treated immediately, and if antibiotics are required its milk is rejected until no trace of the antibiotic remains in its system. The growth hormone recombinant bovine somatotropin (RBST), which stimulates milk production, is also illegal in Canada. Canadian milk producers must conform with Health Canada's decisions and with Canadian regulations in order to ensure the purity of Canadian milk products.

Milking

Cows are usually milked twice a day, although in some cases they are milked three or four times a day. The milk is collected with a milking machine. It then passes through a piping system, the milk line, which conveys it to a stainless-steel cooling tank. The milk is kept in this tank at 1°C - 4°C, or just above the freezing point, until it is picked up.

The temperature of the milk must be lowered as quickly as possible, which is why the bulk tank has an excellent cooling capacity and is maintained in perfect condition. Efficiently cooling milk at the farm involves lowering the temperature from 38°C, (the temperature of milk just out of the cow's teat) to 4°C in less than 60 minutes.

The temperature of the milk must be lowered as quickly as possible in order to slow down the activity of micro-organisms present. This is why the bulk tank has an excellent cooling capacity and is maintained in perfect condition. Efficiently cooling milk at the farm involves lowering the temperature from 38°C (the temperature of milk just out of the cow's teat), to 4°C in less than 60 minutes.

Milk Transportation

Milk is picked up at the farm every two days by an insulated transport tanker. The driver is responsible for determining whether a producer's milk is fit to be loaded into the tanker after checking its temperature, appearance and smell. He then takes a sample of the milk to determine the protein, lactose and butterfat content. He may also take a second sample for quality control testing in laboratories.

The capacity of the regular tankers varies between 10,000 and 35,000 L. The pick-up routes have been designed to avoid overlaps. The transport tanker is insulated to prevent the milk from getting hot in the summer or freezing in the winter. The reflecting surface of the trucks also provides protection against infrared rays and reduces the degree of heat on the tank. Likewise, insulated silos at the plants keep the milk below 4°C.

Quality Control Procedures

Dairy equipment, premises and production methods, both at the farm and at the plant, must meet strict quality and cleanliness standards. The farm, stable, milk house and herd are subject to periodic inspections.

The quality and composition of milk are checked when it is picked up at the farm and when it is delivered to the plant. Samples are taken to determine the fat, protein and lactose content, as well as the total bacteria and somatic cell counts.

If necessary, these tests can be used to evaluate the organoleptic characteristics of milk (appearance, smell and taste) and to detect any trace of antibiotics and antiseptics that might have accidentally gotten into the milk. Therefore, each tank of milk undergoes residue testing. If the test results do not meet quality standards, the milk is disposed of and the producer responsible for the contamination must pay all of the costs associated to excluding the milk from the food chain.

The milk-product distribution system is also subject to strict quality standards. Specific rules regulate the transportation of dairy products and their display in the dairy case. All products are identified and stamped with a "Best before" date. Spot checks are done at various points of sale and any product still in the dairy case after the expiry date is removed.

At the Plant

Milk contains about 4% fat when it leaves the farm. At the plant, the milk is subjected to a standardization process to adjust the fat content to the type of milk required.

The next step is pasteurization. The process involves heating the milk for a period of time depending on the heating temperature. For example, if the milk is heated at 72°C-75°C, the process will take only 16 seconds. The milk is then quickly cooled to below 4°C. Pasteurization destroys harmful micro-organisms and prolongs the storage period, while preserving the natural taste and nutritional value of milk.

For obvious health reasons, all dairy products must be pasteurized before being sold, with the exception of raw milk cheese. Regulations provide for a 60-day ripening period, which makes it fit for consumption.

The next step after pasteurization is homogenization. This process splits fat cells into fine particles that are distributed uniformly throughout the milk, thus preventing the fat from rising to the surface.

Cheese

Three steps are involved in cheesemaking: curdling or coagulation, dripping and ripening. The surface of cheese can be soft, hard, dry, or even cooked. Cheese, in all its forms, is an excellent source of protein, calcium and riboflavin.